

CHAPTER 0 Calculator Notes for the fx-7400G Plus

To display the Main Menu screen of this calculator while in any mode, press **MENU**. If the Main Menu screen is not immediately displayed, press **QUIT** **MENU** or **AC/ON** **MENU**. There are nine modes that can be accessed from the Main Menu screen. To access a mode, use the arrow key to highlight the icon you want, and press **EXE** to display the first screen of the mode you selected. You can also enter a mode without highlighting an icon in the Main Menu by inputting the number marked in the lower-right corner of the icon.

Many of the operations performed by this calculator can be executed by pressing function keys **F1** through **F4**. Pressing **▶** sometimes shows more options. The operation assigned to each function key changes according to the mode. Function menus are at the bottom of the display in each mode.

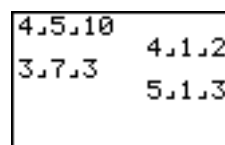
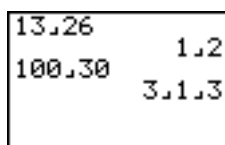
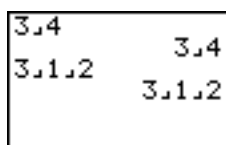
This calculator has nine different modes or work areas, depending on the type of operation you want to perform. When you first turn on your calculator, you see the Main Menu, which is a screen containing icons for the nine different modes. Pressing **MENU** also displays the Main Menu. You choose an icon from the Main Menu either by pressing its number or by using the arrow keys to highlight its icon and pressing **EXE**. Arithmetic calculations including calculations using fractions are performed in RUN mode.



Note 0A • Fractions

This calculator has two special keys to facilitate work with fractions. From the Main Menu, select RUN and press **EXE**. To ensure that the calculator has the correct settings, press **SHIFT** **[SET UP]** to display the setup screen. Make sure that Simplify is set to Auto and that Frac is set to a_b/c. The Frac setting is below Simplify. Just arrow down and the screen will scroll. (See **Note 1J** for an explanation of the setup options.)

- a_b/c** is used to enter a number as a fraction or as a mixed number. A mixed number contains two $\frac{\Box}{\Box}$ symbols. The first $\frac{\Box}{\Box}$ separates the whole number and the fraction, and the second $\frac{\Box}{\Box}$ separates the numerator and denominator. To enter $\frac{3}{4}$, press **3** **a_b/c** **4** **EXE**. To enter $3\frac{1}{2}$, press **3** **a_b/c** **1** **a_b/c** **2** **EXE**. Fractions are automatically displayed in reduced form. (If you don't want fractions to be automatically reduced, see **Note 1J**.)



- F \leftrightarrow D** converts fractions to decimal numbers, and vice versa. A nonrepeating decimal number that has a fraction equivalent with fewer than nine digits in the numerator and denominator combined will convert. (If the number is a repeating decimal number, you can use the RPT DEC program in **Note 0H** to find the equivalent fraction.) To change a decimal to a fraction, enter the decimal and press **EXE** **F \leftrightarrow D**. The $\frac{\Box}{\Box}$ symbol separates the numerator from the

(continued)

denominator. $\boxed{F \leftrightarrow D}$ is also used to send images to a computer, so if the conversion does not seem to work, select LINK from the Main Menu and press \boxed{EXE} $\boxed{F4}$ (IMGE) $\boxed{F1}$ (Off).

0.0625 1.16
1.16 0.0625

1234.5678 617.2839
12345.6789 1.818382678

π 3.141592654
1234.5678 0.2173300458

- c. \boxed{SHIFT} $\boxed{[d/c]}$ converts mixed numbers to improper fractions, and vice versa.

4 2/3 14/3
11 1/5 2 1/5

To enter and solve $\frac{2}{3} + \frac{1}{2}$, press $\boxed{2}$ $\boxed{a\%}$ $\boxed{3}$ $\boxed{+}$ $\boxed{1}$ $\boxed{a\%}$ $\boxed{2}$ \boxed{EXE} . The answer to a problem that involves only fractions will be in the form of a fraction or a whole number. However, the answer to a problem that involves a decimal will be in decimal form. To convert the terminal decimal answer to a fraction, and vice versa, press $\boxed{F \leftrightarrow D}$.

2/3+1/2 1 1/6
.5(1.2-1.5) 0.15

2/3+1/2 1 1/6
.5(1.2-1.5) 3/20

As an alternative to using the special fraction keys, you can enter a fraction as a division problem. To work with simple fractions like $\frac{4}{7}$ and improper fractions like $\frac{7}{4}$, simply enter them into your calculator as division problems. To see the answer displayed as a fraction, you must press $\boxed{F \leftrightarrow D}$. Often you don't need to use parentheses around a fraction entered as a division problem, but when in doubt, put in the parentheses.

2/5+3/4 17/20
2.5+3.4 5.9

(4/5)^2 0.64
(4.5)^2 20.25

2/3*3/5 2/5
2.5

Note 0B • Exponents

There are several ways to raise a number to a power by using the calculator. The simplest way to square a number (raise it to the second power) is to use $\boxed{x^2}$. Enter the number you want to square and then press $\boxed{x^2}$. When you press \boxed{EXE} , the calculator will multiply the number by itself. For all powers (including the second power), you can use $\boxed{\wedge}$.

3^2 9
3^4 81

(continued)

The order of operations requires that you do all operations within parentheses first, evaluate all powers second, multiply and divide from left to right third, and add and subtract from left to right last.

2×5^2	50
$6 + 2^4$	22

$(2 \times 5)^2$	100
$(6 + 2)^4$	4096

Note 0C • Negation and Subtraction

Negation and subtraction are performed with different keys on this calculator. Negation, $(-)$, changes the sign of a number or a variable. It is slightly shorter than the subtraction symbol. If you enter the wrong symbol, you may get an error message.

$10 - 7$	3
$10 - 7$	Syn ERROR

In the order of operations, negation is treated like “multiply by negative 1,” so it is performed before addition and subtraction but after evaluation of powers. Sometimes you may need to use parentheses to get the correct result.

$-4 + 7$	3
$-(4 + 7)$	-11

-4^2	-16
$(-4)^2$	16

Note 0D • Recursion

The Ans command on the calculator allows you to use the result of your last calculation in your next calculation. If you press $\boxed{\text{EXE}}$ without pressing another key, the calculator will repeat the last operation on the previous result. Combining these two features allows you to perform on-screen recursion, calculating a new number by repeating the operation using the result of the previous calculation. To create patterns of numbers (sequences), follow this procedure:

- Enter the starting number of your sequence and press $\boxed{\text{EXE}}$.
- Enter an expression using Ans. You can get Ans by pressing any of the operation keys, such as $\boxed{+}$, $\boxed{-}$, $\boxed{\times}$, $\boxed{\div}$, $\boxed{\wedge}$, $\boxed{x^2}$, or by pressing $\boxed{\text{SHIFT}} \boxed{\text{Ans}}$.
- Press $\boxed{\text{EXE}} \boxed{\text{EXE}} \boxed{\text{EXE}}$ and so on. Each time you press $\boxed{\text{EXE}}$, you will get one more term in the sequence.

$\text{Ans} + 7$	4
	11
	18
	25

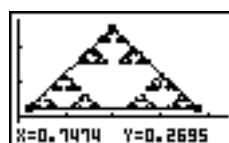
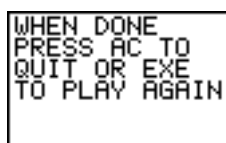
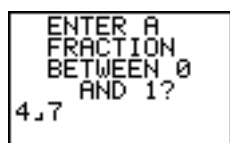
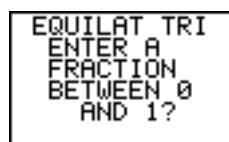
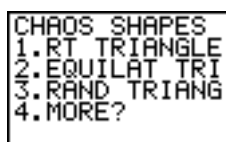
4	4
$\text{Ans} \times 3$	12
	36

$\text{Ans} \times 3 - 5$	4
	7
	16
	43

Note 0E • The Chaos Game

To play the Chaos game, follow these steps:

- Link or manually enter the CHAOS program into your calculator.
(See **Note 0F** and **Note 0G**.)
- From the Main Menu, arrow to PRGM and press **[EXE]**. Arrow down to select CHAOS and press **[EXE]**.
- You are asked to choose a Chaos shape. Press the appropriate number and **[EXE]** to select the shape.
- You are then asked to enter a fraction between 0 and 1. You can enter this value either as a fraction or as a decimal number. Press **[EXE]**. The calculator will plot 1000 points by following the Chaos rules to plot a fractal.
- When the program is done, press **[EXE]** to play again or **[AC/ON]** to quit.



```
File Name:CHAOS
ClrText↓
"CHAOS SHAPES"↓
Lbl 0↓
"1.RT TRIANGLE2.EQUILAT TRI3.RAND
  TRIANG4.MORE"?→A↓
A<4⇒Goto 1↓
ClrText↓
"5.SQUARE"↓
"6.PENTAGON"↓
"7.HEXAGON"↓
"8.GO BACK"↓
?→A↓
Lbl 1↓
A=1⇒Goto 2↓
A=2⇒Goto 3↓
A=3⇒Goto 4↓
A=5⇒Goto 5↓
A=6⇒Goto 6↓
A=7⇒Goto 7↓
A=8⇒Goto 0↓
Lbl 2↓
" RT TRIANGLE"↓
{.05,.95,.05}→List 1↓
{.05,.05,.65}→List 2↓
```

```
Goto 8↓
Lbl 3↓
" EQUILAT TRI"↓
{.05,.95,.5}→List 1↓
{.05,.05,.65}→List 2↓
Goto 8↓
Lbl 4↓
" RANDOM TRI"↓
{Ran#,Ran#,Ran#}→List 1↓
{.7×Ran#,.7×Ran#,.7×Ran#}→List 2↓
Goto 8↓
Lbl 5↓
" SQUARE"↓
{.2,.8,.8,.2}→List 1↓
{.05,.05,.65,.65}→List 2↓
Goto 8↓
Lbl 6↓
" PENTAGON"↓
.5+.35sin (72°×{0,1,2,3,4})→List 1↓
.35+.35cos (72°×{0,1,2,3,4})→List 2↓
Goto 8↓
Lbl 7↓
" HEXAGON"↓
.5+.35sin (60°×{0,1,2,3,4,5})→List 1↓
.35+.35cos (60°×{0,1,2,3,4,5})→List 2↓
(continued)
```

(File Name: CHAOS continued)

```

Lbl 8↓
ClrGraph↓
ViewWindow 0,1.1,.25,-.2,.7,.25↓
S-Gph2 DrawOff↓
S-Gph3 DrawOff↓
S-WindMan↓
S-Gph1 DrawOn,xyLine,List 1,List 2,1,
    Square↓
DrawStat↓
List 1[1]→X:List 2[1]→Y↓
Dim List 1→N↓
F-Line X,Y,List 1[N],List 2[N]↓
" ENTER A "↓
" FRACTION"↓

" BETWEEN 0"↓
" AND 1"?→F↓
"WHEN DONE"↓
"PRESS AC TO"↓
"QUIT OR EXE"↓
"TO PLAY AGAIN"↓
For 1→J To 500↓
Next↓
For 1→J To 1000↓
Int (N×Ran#+1)→P↓
X+(List 1[P]-X)×F→X↓
Y+(List 2[P]-Y)×F→Y↓
Plot X,Y↓
Next

```

Note 0F • Linking Programs or Lists

To transfer a program or list from one calculator to another, follow these steps:

- Connect two calculators by using a link cable. Be sure that the connection is tight on each unit.
- Turn on both calculators, and on each one select LINK from the Main Menu and press **EXE**.



- On the **receiving calculator**, press **F2** (RECV) so that the calculator displays Receiving....
- On the **sending calculator**, press **F1** (TRAN).



- Arrow down to the program or data you want to send. Press **F1** (SEL) to select a program or list. You can select more than one program and/or list and send them simultaneously. Just continue to arrow down, pressing **F1** (SEL) at each program or list you want to transmit. Then, press **F4** (TRAN) to display the transmit menu. When you are ready to transmit, press **F1** (YES).



- When the transfer is complete, the screen will display Communication Complete! on both calculators.

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Errors

If you get a Transmit ERROR! message, check each calculator to be sure the link cable is pushed all the way in and try again. Remember that after you arrow to the program or list you want to send, you must press **[F1]** (SEL) to select it to transmit. Also, the receiving calculator must be Receiving before the sending calculator transmits. If the receiving calculator already has a program or list that has the same name as the one you are sending, the sending calculator will ask if you want to overwrite the item on the other calculator. Select **[F1]** (YES) to overwrite, or **[F2]** (NO) to skip transferring that item.

Note 0G • Entering a Program

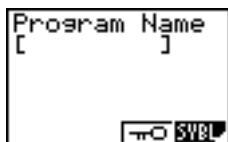
Your calculator is like a small computer. You can instruct (or program) it to do calculations or to communicate with other devices. What follows is not instructions for writing a program, but instructions for entering a calculator program that has already been written. You must be very careful to enter the commands exactly as they are written. Changing the program in any way will alter how it runs and may cause an error.

There are three ways to enter a program into your calculator. Two easy ways are to download a program from either a computer or another calculator. To use a computer, download the program from a CD-ROM or website directly into your calculator by using the Casio FA-122 or FA-123 Program-Link™ software and the appropriate cable. To use another calculator that has the program in its memory, link the two calculators with a link cable and transfer the program. (See **Note 0F**.) The third way to enter a program is to do it manually by following these steps:

- a. Select PRGM from the Main Menu.



- b. Press **[F3]** (NEW) to name the program. (Use the red letters above the number and operation keys.) You are already in Alpha Lock, so do not press **[ALPHA]** unless you want to enter a number in the program name. When the name is complete, press **[EXE]**.



- c. Enter the program exactly as you see it. Lowercase letters in the command indicate that you must find the command on the calculator. You can find many programming commands by pressing **[SHIFT]** [PRGM] and looking under COM, CTL, and JUMP. The **[▶]** key will often give you more options. Use the function keys to access the commands shown at the bottom of the screen. To find other commands, press the appropriate function key or look at the function options by pressing **[OPTN]** **[ALPHA]** **[VAR]** **[SHIFT]** **[SET UP]** **[SHIFT]**.

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You can look in the back cover of your *fx-7400G Plus User's Guide* to determine which calculator key to press. If you enter a command from the calculator text screen, all the letters will be uppercase. The command won't look the same, and it won't work.

```
= CHAOS =
ClrText
"CHAOS SHAPES
"
Lbl 0
COM CTL JUMP
```

```
= CHAOS =
ClrText
"CHAOS SHAPES
"
Lbl 0
DWINFACT
```

- d. Use **[SHIFT]** **[INS]** **[EXE]** to insert a new line between two lines. Use **[DEL]** on a blank line to delete that line.
- e. Press **[QUIT]** twice when you finish entering the program.

Errors

You can edit the program if there is an error or if you need to make a change.

- a. Select PRGM from the Main Menu. Arrow down to the program name and press **[F2]** (EDIT).
- b. Scroll down through the program to find the error. Studying the entire program on paper is often easier than working from the calculator screen, where you can see only a small portion at one time. Use **[SHIFT]** **[INS]** or **[DEL]** as needed to make changes. When you are finished making corrections, press **[QUIT]**.
- c. If you get an error message when you execute a program, press the arrow key to the right. The calculator will automatically switch to the EDIT mode and scroll to the line with the error. Then proceed as in step b.

```
Program List
WALKER
CHAOS
RPT DEC
BOWLING
[EXE] [EDIT] [NEW]
```

```
Syn ERROR
```

Note 0H • Generating Random Integers

You can generate random integers within an interval by using the Int and Ran# commands. From the Run screen, press **[OPTN]** **[F4]** **[F1]** (NUM) **[F2]** (Int) to access the integer part command. Press **[OPTN]** **[F4]** **[F4]** (PROB) **[F4]** (Ran#) to access the random number command.

To randomly generate integers between two values, enter $\text{Int}(\text{Ran#}(H - L + 1)) + L$, where H is the highest integer and L is the lowest integer. For example, to generate integers between 43 and 57, enter $\text{Int}(\text{Ran#}(15)) + 43$. Pressing **[EXE]** will generate as many of these integers as you like.

```
NUM ANGLE
```

```
Int
Abs Int Frac Rand
```

```
Int (
LIST CALC STAT PROB
```

```
Int (Ran#x(15
+1))+43
56
x! nPr nCr Ran#
```

To randomly generate a particular number of integers in an interval—for example, five integers between 43 and 57—select the Seq command by

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pressing $\boxed{\text{OPTN}} \boxed{\text{F1}} \boxed{\text{(LIST)}} \boxed{\text{F4}} \boxed{\text{F1}} \boxed{\text{(Seq)}}$, enter the formula as before, and then add ,x,1,5,1 to generate five random numbers in this interval.

```
Seq(Int (Ran#
x(15+1))+43,X
,1,5,1)
x! nPr nCr Ran#
```

```
Ans
1 51
2 49
3 53
54
x! nPr nCr Ran#
```

Note 0I • The Repeating Decimal Program

The RPT DEC program can be used to convert a repeating decimal to a fraction. Follow the steps below:

- Link or manually enter the program into your calculator. (See **Note 0F** and **Note 0G**.)
- In the Main Menu, arrow to PRGM and press $\boxed{\text{EXE}}$. Toggle the arrow key down to select the program labeled RPT DEC and press $\boxed{\text{EXE}}$.
- You are asked to enter your decimal. Enter your decimal, including at least one digit more than one repeating cycle, and press $\boxed{\text{EXE}}$. For example, if your number is .133333 . . . , you could enter .133, .1333, or .13333, and so on.
- You are then asked how many digits repeat. In our example, the 3 is the only digit that repeats, so press $\boxed{1} \boxed{\text{EXE}}$.

```
ENTER DECIMAL
?
.133
```

```
.133
HOW MANY
DIGITS
REPEAT?
1
```

- You are next asked how many digits come before the repeating digits. In our example, .133333 . . . , there is one digit (the 1), so press $\boxed{1} \boxed{\text{EXE}}$.

```
HOW MANY
DIGITS COME
BEFORE THE
REPEATING
DIGITS?
```

- The equivalent fraction will be displayed on the screen. You can then use $\boxed{\text{F} \leftrightarrow \text{D}}$ to convert back and forth between fraction and decimal.

```
BEFORE THE
REPEATING
DIGITS?
1
2.15
```

File Name:RPT DEC

"ENTER DECIMAL"↵

?↵N↵

"HOW MANY "↵

"DIGITS "↵

"REPEAT"?↵P↵

"HOW MANY "↵

"DIGITS COME"↵

"BEFORE THE"↵

"REPEATING"↵

"DIGITS"?↵L↵

Int (10^L×N)→R↵

Frac (10^L×N)→S↵

Int (S×10^P)→C↵

(10^P-1)×10^L→B↵

10^L→A↵

R↵A+C↵B